

## CONTROLLING GENE EXPRESSION IN LIVING CELLS

### Abstract of the Disclosure

Methods for controlling expression of a gene in a living cell are disclosed. In general, the methods include contacting the 5'untranslated region (5' UTR) of an RNA in the cell with a cell permeable, small molecule. In some embodiments of the invention, the method includes providing an aptamer that binds specifically to the cell permeable, small molecule; incorporating the aptamer into a region of a gene, which region encodes a 5' UTR of an RNA; and contacting the cell-permeable, small molecule with a cell that contains the gene. The cell-permeable, small molecule enters the cell and binds specifically to the aptamer sequence in the 5' UTR of RNA molecules transcribed from the gene. This binding specifically inhibits translation of the RNA molecules to which the cell permeable, small molecule is bound, thereby controlling expression of the gene.

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